

THE ALGAE OF UTAH LAKE. PART II.

William J. Harding¹

This paper is the second in a series to update and to contribute to the known algal flora of the state of Utah as well as Utah Lake. Included here are 17 new records for Utah, and 3 other species which have not been previously reported from Utah Lake. It is hoped that the contributions made within these reports will be the starting point to other related investigations.

I wish to thank in addition to those previously mentioned (Harding, 1970) Drs. D. A. White and V. M. Tanner, Department of Zoology, and Drs. S. L. Welsh and W. D. Tidwell, Department of Botany and Range Science, Brigham Young University, Provo, Utah, for their encouragement and guidance. This study is one of many being conducted through the Utah Lake Research Station, Brigham Young University, Provo, Utah.

CYANOPHYTA

Anabaena oscillarioides Bory

Fig. 6

Filaments straight, entangled or solitary. Cells barrel-shaped or truncate-globose, 4-6 μ in diameter, 7-8 μ long. Heterocysts round or ovate; 6-8 μ in diameter, 6-10 μ long. Gonidia cylindrical; developing on both sides of heterocyst (rarely on one side only) or in a series; 8-20 μ in diameter, 20-40 μ long. Forming thin films on detritus, or subaerial in swampy places along the margin of the lake and in backwater pools.

Chroococcus minor (Kuetz.) Naegeli

Fig. 2

A small gelatinous attached and amorphous mass in which cells are irregularly scattered, singly, in pairs, or in larger groups. Cells are spherical or angular from mutual compression and the contents nongranular, pale to bright blue-green; individual sheaths scarcely visible, confluent with the colonial envelope; cells 3-4 μ in diameter without sheath. Found intermingled with dense clots of miscellaneous algae; sometimes buried in the decaying tissues of higher plants. New record for Utah.

Chroococcus minutus (Kuetz.) Naegeli

Fig. 3

A small, amorphous, mucilaginous mass in which spherical or hemispherical cells are compactly arranged within a wide hyaline

¹Department of Botany and Range Science, Brigham Young University, Provo, Utah.

envelope; individual cell sheaths indistinct, not laminated; cell contents blue-green, either finely granular or homogeneous; cells 4-10 μ in diameter without sheaths. Found around dense algal growths in shallow-water and isolated ponds and in swamps. New record for Utah.

Chroococcus turgidus (Kuetz.) Naegeli

Fig. 4

A free-floating colony of 2-4 ovoid cells enclosed by wide, hyaline, and lamellate colonial sheath; cells bright blue-green, contents granular, enclosed by individual sheaths, 8-32 μ in diameter without sheath, 15-50 μ wide with sheath. Found in same habitat with *C. minutus*.

Coelosphaerium dubium Grunow

Fig. 7

Plant a spherical or irregularly shaped colony of spherical cells, or an aggregate of colonies in a common gelatinous envelope; free-floating; cell arranged to form a peripheral layer with the colonial mucilage, producing a hollow sphere; cell contents blue-green, either homogeneous or with pseudovacuoles; cells 8-10 μ in diameter. Rare in euplankton. New record for Utah.

Lyngbya major Meneghini

Fig. 9

Plants solitary among other algae; filaments straight; trichomes not or very slightly tapering to the apices, which are capitate, 11-17 μ in diameter; cells 4-5 times wider than long, 2-4 μ in length, not constricted at the crosswalls, which are granulose; cell contents homogeneously granular; sheaths thick (3-3.7 μ), firm, and usually laminated; filaments 22-26 μ in diameter. Tychoplanktonic and in shallow backwater ponds.

Marssoniella elegans Lemm.

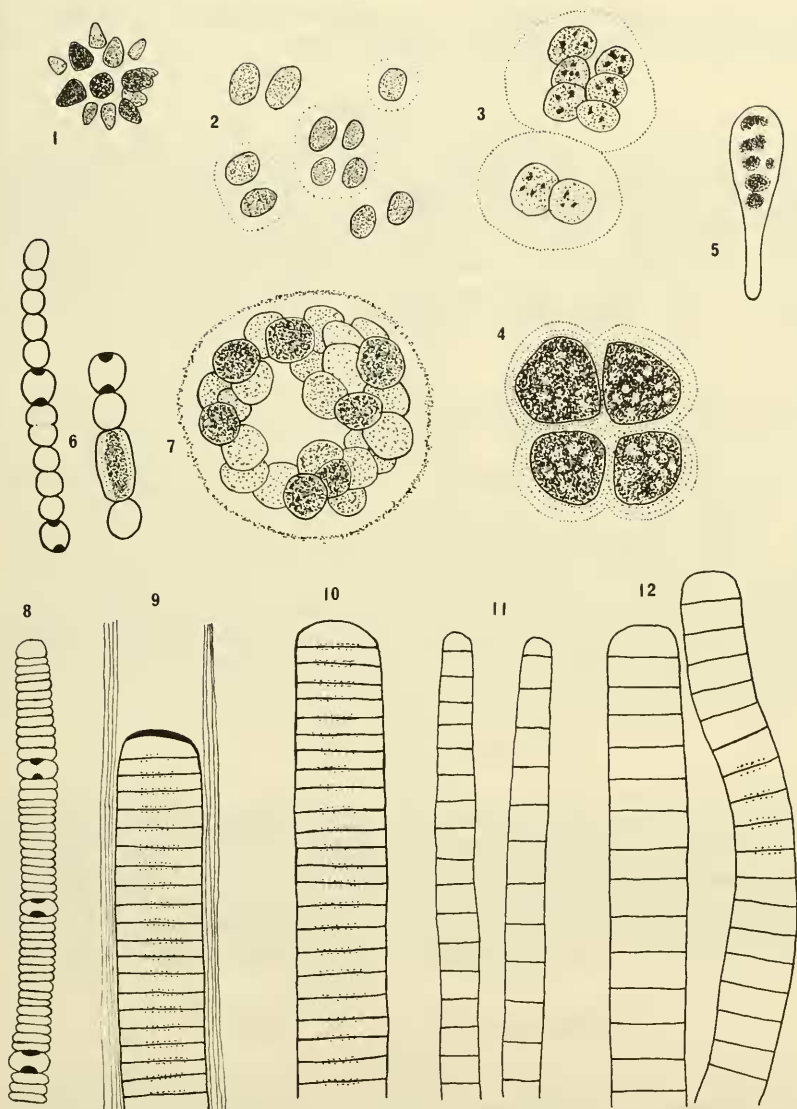
Fig. 1

A colony of 8-12 ovoid or pyriform cells, radiately arranged, with their narrow ends directed outward, enclosed by a thin, transparent sheath; cells 1.5-5 μ in diameter, 5-6 μ long. Rare in euplankton. New record for Utah.

Nodularia Harveyana (Thu.) Thuret

Fig. 8

Filaments usually solitary; nearly straight, not entangled. Sheaths colorless and thin, usually diffuent and becoming indistinct. Cells 4-6 μ in diameter, length $\frac{1}{3}$ the diameter. Apical cell obtusely conical.



WJH

1. *Marssoniella elegans* Lemm. 800X
2. *Chroococcus minor* (Kuetz.) Naegeli 1000X
3. *C. minutus* (Kuetz.) Naegeli 1000X
4. *C. turgidus* (Kuetz.) Naegeli 400X
5. *Characiopsis cylindrica* (Lambert) Lemm. 700X
6. *Anabaena oscillarioides* Bory 800X
7. *Coelosphaerium dubium* Gron. in Raben. 600X
8. *Nodularia Harveyana* (Thu.) Thuret 1000X
9. *Lyngbya major* Menghini 750X
10. *Oscillatoria limosa* (Roth) C. A. Agardh 750X
11. *O. tenuis* C. A. Agardh 800X
12. *O. nigra* Voucher 1100X

cal. Gonidia nearly spherical or compressed-spheroidal; about 8 μ in diameter. Tycho plankton in shallow water.

Oscillatoria bornetii Zukal

Trichomes forming a slimy, expanded plant mass, or intermingled among other algae; more or less straight but often bent or slightly sigmoid in the apical region, not tapering toward the apex. Apical cell smoothly rounded, not capitate, and without a calyptra. Cells 10-16 μ in diameter, 3.7-4 μ long; not constricted at crosswalls; cell contents pale with large quadrangular alveolations or vacuoles. Found in the tycho plankton, backwater pools and slowly flowing water.

Oscillatoria limosa (Roth) C. A. Agardh

Fig. 10

Trichomes usually forming a dark blue-green or brownish plant mass attached to submerged objects or forming films on sandy bottoms, rarely solitary or loosely entangled among filamentous algae; straight, tapering little or not at all toward apex. Apical cell rotund, the outer membrane thickened but without a definite calyptra. Cells 12-20 μ in diameter, 3.7-5 μ long, not constricted at crosswalls, which are usually granular. Common in stagnant backwaters and small ponds cut off by receding waters, in the tycho plankton.

Oscillatoria nigra Vaucher

Fig. 12

Trichomes aggregate to form a thick, mucilaginous blackish-green plant mass on submerged objects, becoming free-floating; straight or slightly entangled and slightly tapering toward the apex, which is straight or curved. Apical cell rotund, not capitate, and without calyptra. Cells 8-10 μ in diameter, 3.5-4.5 μ long; slightly constricted at the crosswalls. Common in backwater sloughs and in Provo Bay.

Oscillatoria tenuis C. A. Agardh

Fig. 11

Trichomes aggregated to form a blue-green mass, sometimes becoming scattered and appearing singly among other algae. Straight or slightly flexuous, especially at the anterior end, which does not taper. Apical cell convex, smooth, and not capitate; outer membrane sometimes slightly thickened; homogeneous sheath frequently present. Cells 4-12 μ in diameter, 2.5-6 μ long; constricted at the crosswalls, which are granular. Very common in backwater ponds and swamps and in the tycho plankton. Most common from Provo Bay.

CHLOROPHYTA

Actinastrum gracilimum G. M. Smith

Fig. 23

Cells cylindrical, with slightly narrowed to abruptly truncate poles, forming colonies or individuals with the long axis of the cells radiating in all planes from a common center; cells $2\ \mu$ in diameter, $17\text{--}20\ \mu$ long, colonies $35\text{--}45\ \mu$ in diameter. Common in the plankton of Provo Bay and Powell's Slough during the summer. New record for Utah.

Actinastrum Hantzschii Lagerheim

Fig. 22

Cells spindle-shaped or cylindrical, narrowed toward the apices, arranged in simple or compound colonies of 4 or 8 with long axes of cells radiating from a common point, cells $4\text{--}6\ \mu$ in diameter, $19\text{--}22\ \mu$ in length. Common in the plankton of Provo Bay and Powell's Slough during the summer. New record for Utah.

Ankistrodesmus falcatus (Corda) Ralfs

Fig. 24

Cells needlelike to spindle-shaped, solitary or in clusters of 2-32, not enclosed by a sheath; chloroplast 1, a parietal plate without pyrenoids; cells $2.5\ \mu$ in diameter, $30\ \mu$ long. Intermingled with other algae in Powell's Slough. Not previously reported for Utah Lake.

Closterium venus Kuetz.

Fig. 14

Cells small, 8-9 times longer than their diameter, strongly curved, outer margin $150^\circ\text{--}160^\circ$ of arc, inner margin not tumid, gradually attenuated to the apices which are acute or acutely rounded; cell wall smooth, colorless; chloroplasts ridged, with two pyrenoids; terminal vacuoles large, with a number of moving granules. Found in the euplankton and in the shallow backwater pools.

Gloeocystis ampla (Kuetz.) Lagerheim

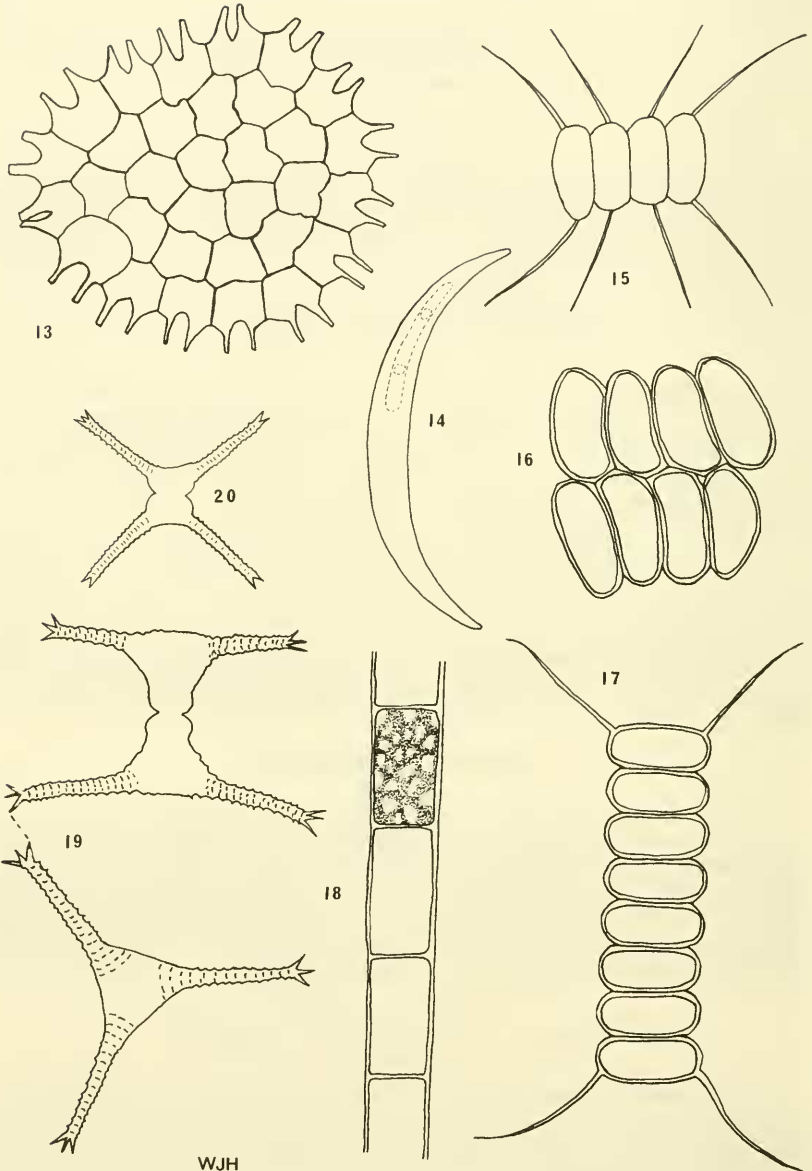
Fig. 21

Cells ovoid or oblong, arranged in amorphous or somewhat globular colonies, embedded in gelatinous envelopes, the sheath of each cell or group of cells distinct and angular from mutual compression; cells $7.5\text{--}12.5\ \mu$ in diameter, $12\text{--}17\ \mu$ long. Rare in the plankton. New record for Utah Lake.

Micractinium pusillum Fresenius

Fig. 26

A free-floating colony of 4-16 spherical cells arranged in groups of 4, forming a pyramid or square; free walls beset with 1-5 finely



WJH

13. *Pediastrum Boryanum* (Turp.) Meneghini 550X
 14. *Closterium venus* Kuetz.
 15. *Scenedesmus abundans* var. *brevicauda* G. M. Smith 1000X
 16. *S. arcuatus* var. *platydisca* G. M. Smith 1200X
 17. *S. quadricauda* var. *parvus* G. M. Smith 900X
 18. *Microspora floccosa* (Vauch.) Thuret 900X
 19. *Staurastrum paradoxom* f. Meyen 500X
 20. *St. natator* f. West 800X

tapering setae; chloroplast a parietal cup with one pyrenoid. Cells 3-7.5 μ in diameter, setae 20-35 μ long. New record for Utah.

Microspora floccosa (Vauch.) Thuret

Fig. 18

Walls relatively thin, sections not always evident in the mid-region of the cell. Cells cylindrical or slightly swollen; 8-12 μ in diameter, 20-45 μ long. Chloroplast usually reticulate. Found in warm backwater ponds and swamps. New record for Utah.

Pediastrum boryanum (Turp.) Meneghini

Fig. 13

Colony entire, cells 5-6 sided with smooth or granular walls; peripheral cells with outer margins extended into 2 blunt-tipped processes; cells up to 14 μ in diameter, 21 μ long. Common in the eu- and tychoplankton in the lake and generally distributed throughout the swamps.

Planktospharea gelatinosa G. M. Smith

Fig. 27

A free-floating colony of spherical cells compactly grouped within a mucilaginous, homogeneous envelope; chloroplasts several, angular, parietal discs, each with a pyrenoid. Cells 20 μ in diameter. Common in the plankton during the late summer in Powell's Slough. New record for Utah.

Scenedesmus abundans var. *brevicauda* G. M. Smith

Fig. 15

Cells oblong or ovate, in a linear series of four. The terminal cells with 1 polar spine and 1 spine on lateral wall, inner cells with a spine at each pole. Cells 2.5-5 μ in diameter, 5-8 μ long. Rare in the plankton at several locations. New record for Utah.

Scenedesmus arcuatus var. *platydisca* G. M. Smith

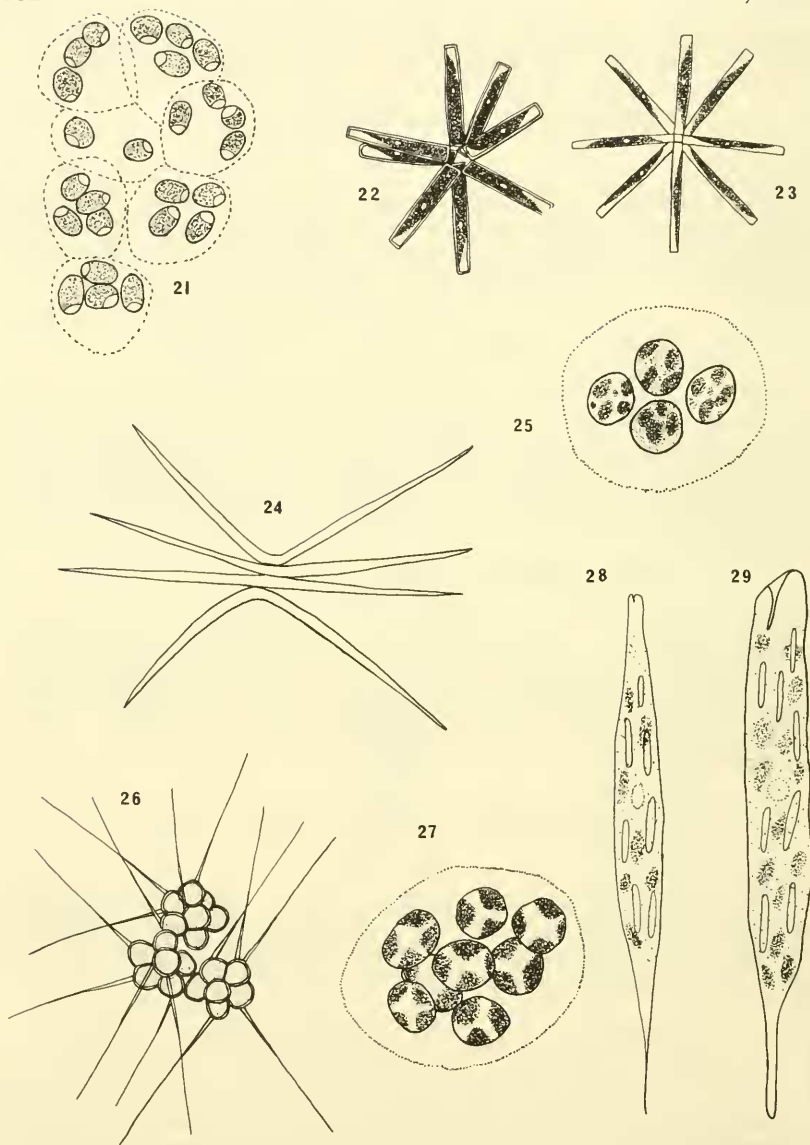
Fig. 16

Plant composed of 8 cells arranged in a flat, double series; cells oblong-elliptic, 4-6 μ in diameter, 8-12 μ long. Planktonic, rare. New record for Utah.

Scenedesmus quadricauda var. *parvus* G. M. Smith

Fig. 17

Colony composed of 2-16 cylindrical-ovate cells in a single series; inner cells spineless; outer cells with a long spine at each pole. Com-



WJH

21. *Gleocystis ampla* (Kuetz.) Lager 400X
22. *Actinastrum Hantzschii* Lager 500X
23. *A. gracilimum* G. M. Smith 500X
24. *Ankistrodesmus falcatus* (Corda) Ralfs. 500X
25. *Chlorobotrys regularis* (W. West) Bohlin 500X
26. *Micractinium pusillum* Fresenius 400X
27. *Planktosphaera gelatinosa* G. M. Smith 400X
28. *Euglena acutissima* Lemm. 500X
29. *E. acus* Ehrenb. 400X

mon in Provo Bay and Powell's Slough during the summer. New record for Utah.

Staurostrum natator West forma?

Fig. 20

Length 14 μ , width 14 μ , isth. 5 μ . Very rare and when seen the plants have been very small, making positive identification difficult. New record for Utah.

Staurostrum paradoxum Meyen forma?

Fig. 19

Cells 62-80 x 82-100 μ isth. 12 μ . Very common in the eu- and tychoplankton during the early spring. New record for Utah Lake.

EUGLENOPHYTA

Euglena acus Ehrenb.

Fig. 29

Cell cylindrical to spindle-shaped, anterior end narrowed and truncate; narrowed posteriorly into a colorless point, pellicle indistinctly spirally striated, slightly metabolic; cells 177 μ long, 20 μ in diameter; chloroplasts numerous discoids; paramylum bodies 2 to several long rods. Found to be somewhat abundant in Provo Bay and Powell's Slough during the summer. Not previously reported for Utah Lake.

Euglena acutissima Lemm.

Fig. 28

Cell cylindrical, elongated, anterior end narrowed with tip truncated or blunt; region anterior to posterior part of reservoir hyaline; extended posteriorly into a prominent, sharp-pointed colorless tip; pellicle longitudinally striated, slightly metabolic; cell 135-140 μ long, 12 μ in diameter; chloroplasts numerous, discoidal; paramylum bodies several, rodlike, located anterior and posterior to nucleus; somewhat abundant in same areas as *E. acus*. New record for Utah.

CHRYSOPHYTA

Characiopsis cylindrica (Lambert) Lemm.

Fig. 5

Cells club-shaped to cylindrical, rounded at the anterior end and tapering posteriorly to a narrow base, cells 45 μ long, 10 μ in diameter. Found to be rare in Provo Bay during late summer. New record for Utah.

Chlorobotrys regularis (W. West) Bohlin

Fig. 25

A spherical colony of 2-8 globose cells regularly arranged within a hyaline, gelatinous envelope; chromatophores, several parietal discs; a conspicuous pigment spot usually visible; cells 12-15 μ in diameter; rare. New record for Utah.

REFERENCES

- GEITLER, L. 1932. Cyanophyceae. In L. Rabenhorst, Kryptogamen flora von Deutschland, Österreich unter der Schweiz. 14:673-1056. 223 figs.
- HARDING, W. J. 1970. A preliminary report on the algal species presently found in Utah Lake. Great Basin Nat. 30(2):99-105.
- JOHNSON, L. P. 1944. Euglenae of Iowa. Trans. Amer. Microsc. Soc. 63(2): 97-135.
- WEST, W., AND G. S. WEST. 1904. A monograph of the British Desmidiaceae. Ray Society, London, Vol. 1.